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Dwarf Conifer Bed Revitalization

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Title: **Dwarf Conifer Bed Revitalization**

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Abstract:

The Morris Arboretum's original dwarf conifer bed, located south of the greenhouse complex, was planted in the 1960's. Although the bed is directly along a major pathway, many staff and visitors are unaware of its existence. It has become overgrown in parts creating the feeling of a green wall, and is bare and unsightly in other sections. The intent of this project is to:

- Relate the collection's history.
- Determine which plants can be removed and what can be planted to increase the value of the site. Additions will include more dwarf conifers and broadleaved shrubs.
- Increase seasonal interest in the site by using deciduous and flowering plants, including bulbs.
- Provide visitor interpretation in the bed in the form of signs explaining what dwarf conifers are and how they can be used effectively in a landscape.
- Increase visitor awareness of the bed and encourage people to walk through it.
- Create a bed that will be interesting, increase the value of the collection, have several seasons of interest, further the Arboretum's mission, and be low maintenance.

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INTRODUCTION

The dwarf conifer bed, directly south of the greenhouse complex, is currently in need of revitalization. Dwarf and slow-growing conifers were originally planted in this bed around 40 years ago, and plants in the bed have become overgrown and unsightly. Plants have grown over pathways, into one another, and into the road. Visitors do not notice the bed, and therefore do not notice the diversity of plants in it. In order to change this, plants have been removed, new plants have been chosen for planting, and plans have been made for increasing visitor interaction in the bed. This paper will address all of these issues and recommend a plan for future expansion and maintenance of the bed.

WHAT IS A DWARF CONIFER?

Conifers are woody plants that bear their seeds and other reproductive structures in cones. "Conifer" comes from the Latin for "cone-bearing." They are gymnosperms (literally, “naked seeds”), meaning their seeds are not protected by a fleshy fruit or nut. Rather, woody scales arranged into a cone protect the seeds. In some cases these scales may be fused or have fleshy growths, as in the case of *Juniperus* and *Taxus*.

Conifers are often evergreen, but a few notable exceptions are the dawn redwood (*Metasequoia glyptostroboides*), larches (*Larix* spp.) and bald-cypresses (*Taxodium* spp.). Leaves are usually needle, scale, or awl shaped.

“Dwarf” is a relative term in the plant world, and sizes of dwarf plants can range from under 1' to over 20' in height. Dwarf simply means the plants do not get as large as their parent species. Dwarf conifers are often referred to as “slow-growing,” because over time they may get quite large. This is apparent in the plants that are currently in the dwarf conifer bed. They have grown from little green mounds to beautiful specimen trees. While they are lovely trees, they have grown out of scale for the site.

Displaying dwarf and slow growing conifers at the Morris Arboretum

The dwarf conifer bed at the Morris Arboretum seeks to display a wide variety of plants. There are dwarf conifers throughout the Arboretum, and this bed is by no means the extent of the dwarf conifer collection in the Arboretum. The concentration behind the greenhouses is simply a chance to display a number of them in one place.

HISTORY

Since the mid 1900s, when people began to spread into the suburbs at a growing rate, dwarf plants have become quite popular. Their size and appearance are better suited to the suburban landscape scale than their larger relatives. The dwarf and slow growing conifer bed at the Morris Arboretum was originally planted in 1965. This was at a time when plants in the Arboretum were arranged taxonomically with related genera placed in the same area. The September 1964 Morris Arboretum Bulletin states that a garden of dwarf and low growing conifers was “currently still in the planning stages.” The article also mentions that dwarf conifers are “a group of plants becoming increasingly popular.” The next mention in the Bulletin was in December 1971, writing that dwarf conifers are increasing in popularity, and that a

collection of them is "along the south edge of the greenhouse complex along the drive." This is the last discussion of dwarf conifers in any Morris Arboretum publication.

After the original planting in 1965, more plants were added and removed as needed. Several plants existing in the bed were given permanent accession numbers in 1975, but the actual planting date is unknown. In the mid-1970's, a cactus garden was installed just east of the dwarf conifer bed, below the Wisteria Walk. This collection lasted only a few years, and was removed in 1978.

In 1999, many plants were moved from the dwarf conifer bed to the Garden Railway site. This exhibit is still in place and the conifers are still there.

Beginning in 2000, there were casual attempts to improve the bed. More conifers and non-coniferous species were planted. Arboretum volunteers, Armand and Roxy Gevjan donated a number of dwarf conifers that were placed in several areas of the Arboretum, including the dwarf conifer bed. These are lovely specimens but have not grown much since being transplanted into the bed.

Throughout the life of the dwarf conifer bed, the plants have continued to grow, and have become more and more crowded. The fate of these plants is discussed in the following section.

CURRENT CONDITIONS OF THE SITE

The site is currently facing less than desirable conditions for growing conifers. An assessment was completed and the results are as follows:

Soil: A soil test taken in fall 2003 provided the following information

pH -- 7.1

Ca -- 16.7 meq/100g (well above optimum levels)

Mg -- 4.2 meq/100g (well above optimum levels)

K -- 0.4 meq/100g (below optimum levels)

P -- 204 lbs/acre (below optimum levels)

Recommendations were to apply 1.75 lbs/100 square feet of a 10-10-10 fertilizer and to add 2.5 lbs/100 square feet of sulfur to lower the pH from approximately 7.0 to 5.5, which is the ideal soil pH for growing conifers.

Sun exposure: Conifers usually prefer sun, but this site has a great deal of shade. The sunniest spot is the narrow patch at the west end of the bed between the tall wall and the road. The new bed expansion, to the east of the dogwood, also provides full sun. However, this area cannot be assumed to remain in full sun once the new plants begin to grow and shade their neighbors.

The shadiest area lies between the ash (*Fraxinus americana*) and the dogwood (*Cornus florida f. rubra*). Even in this area, all plants receive some sun during the day. However, many areas are shaded enough to create less than welcoming growing conditions for conifers.

Condition of existing plants: For the most part, existing plants in the bed are healthy. There are a few plants that have become bare on entire sides from being shaded by plants growing next to them. The newest plantings (planted in 2001) look healthy but have not grown since being planted. This is probably due to lack of sun. The oldest conifers in the bed were planted in 1964, and have grown quite large. Ten plants were removed in fall, 2003 due to crowding, unattractiveness, or poor health. Two more were removed in spring, 2004.

Solutions to current problems:

Soil: To lower the pH from 7.1 to a more ideal 5.5, sulfur was added to the bed. 100 pounds of Disper-Sul (a rate of 2.5 lbs. per 100 ft.) were added. After the sulfur was applied, a new layer of pine needle mulch was spread. The pine needles serve to lower pH as they break down, and also protect the soil from over-drying and extreme temperatures.

Sun exposure: The bed must be planned with the knowledge that a large portion of the bed will not have full sun exposure. Therefore, plants will be chosen based on their shade tolerance in addition to size and appearance. Broadleaved shrubs may be more appropriate for these areas than most conifers.

Condition of existing plants: Since most plants that remain in the bed are healthy, there is little to be done. Minimal pruning, for aesthetic purposes and to keep plants from growing into one another, will need to be done annually. Improvements to the soil (see above) will also help keep new and existing plants healthy.

GOALS FOR THE SITE

In order to make this bed renovation a success, we must meet several main goals for the site. The first is to ensure that the plants within the bed are healthy and performing at their best. The soil must be healthy, and plants must be placed according to their cultural requirements. Plants should be planted to scale for the site, with adequate spacing to allow for future growth. For a planting list, see Appendix A.

Second, the design of the bed should showcase the diversity of dwarf conifers (color, size, shape, texture) and demonstrate how conifers can enhance a garden design. With this design, we expect the bed to become more open and transparent, allowing people to see into the bed. A large aspect of this project is to increase visitor's awareness of the bed and to encourage them to pause and appreciate it (see section below on Visitor Interaction).

Third, the plants must meet the practical needs of the site. The plants should block the view into the Medicinal House yet preserve or frame views from the top of the Wisteria Walk to the Sculpture Garden. The plants will need to continue to hold the slope to prevent erosion onto the road. They must also be kept off the main road to maintain visibility around the curve. We also hope to add more rocks to the bed. Rocks help to accentuate plants and their unusual colors and habits, as well as hold the slope.

Finally, during the next three years, the bed will be expanded further east along what is currently a grassy slope.

Visitor Interaction

The Arboretum's mission is education, research, outreach, and horticultural display. If people do not notice the bed or learn from it, then it is not serving our primary goals. We would eventually like to see the visitors interact with the bed. At the very least, they should feel inclined to stop along the main road and look at the plants. At best, they should walk through the bed and observe the plants more closely.

There is currently no interpretation in the bed. Interpretation helps visitors understand the purpose of a display and exposes them to new ideas. Interpretive labels describing dwarf and slow growing conifers will be placed in the bed (see Appendix B). This will signify the dwarf conifer bed as a display and cause visitors to stop and look at it.

Before any effort is made to bring visitors into the bed, we must block their access to a garage where pesticides are stored and mixed. Once we have made the area safe for visitors to walk through by preventing them from entering staff-restricted areas, we can encourage visitors to explore the bed. Access to the Medicinal House, head house stairs, and garage can be blocked with a chain between posts and a sign reading, "Do not enter." A more aesthetically interesting way to block the path would be to use plant material, planting conifers to block the path or to eventually grow into the path. Another option would be to build a fence

Visitors who come south from the Wisteria Walk do not turn right into the conifer bed because a large ash tree (*Fraxinus americana*) blocks the way around the corner of the Medicinal House. Since the ash will not be removed, we must find a way around it. The best solution here is to build up and level part of the slope south of the ash, with stones or some other structure to create a path that will not be a danger or an inconvenience to visitors. The physical facilities staff is currently working on a plan to accomplish this.

FUTURE CONSIDERATIONS

The first year (2004) will see completion of planting, the first phase of soil amendment, interpretation, and some minor construction. However, this bed renovation will need to continue over a period of two or three years. Here are some guidelines for the further expansion and upkeep of the dwarf conifer bed:

Annual maintenance

New plants will need supplemental watering for the first year and should be monitored for up to five years, until they are established. Watering excessively should be avoided, as conifers prefer soils that are not constantly wet.

If the soil pH remains high, there should be reapplications of sulfur. In addition, pine needles should continue to be used at the site to decrease pH as well as act as mulch, protecting roots from excessive cold or drought. The pine needle mulch should be applied annually.

Dwarf conifers can be prone to reversions, in which case a vigorous, non-dwarf shoot will grow and extend above the rest of the plant. These reversions, both of size and of color, are more vigorous than the rest of the plant. They will soon dominate the entire plant and cause the desirable effects of the cultivar to be lost if they are not removed. Reversions should be removed at their source.

All plants should be assessed to determine if they are growing into or crowding other plants. In order to avoid another situation like the one we are currently in, plants should be kept separate from one another with selective pruning. If the plants become over-crowded they will need to be transplanted or removed, but the intent is to avoid the need for another overhaul of the bed. In addition, all plants will need to be kept off the main road and secondary path. Pruning can also be used to accentuate the unique habit of a plant. The *Pinus densiflora* 'Globosa' at the top of the stairs is an example of this.

One time (Construction)

The bed has been extended slightly in this first year, southeast of the dogwood. In future years, the bed will be extended to the *Yucca filamentosa* grouping near the steps to the Wisteria Walk. Some plant choices are listed in Appendix C.

The path along the northern side of the bed is going to be made more accessible to visitors. The section on Visitor Interaction describes the goals for this in greater detail.

Removals

Subsequent years will see the removal of at least four plants. The two junipers (*Juniperus sp*.) at the west and east sides of the bed are being pruned back over a period of three years. Nearby plants should be large enough to lessen the impact of the removals. Similar steps are to be taken with the two spruces (*Picea glauca* 'Conica') lining the stairs to the medicinal house door. They are entirely shaded on one side with dead centers, and any pruning would reveal large bare spots. Therefore, these will need to be removed completely once surrounding plants have grown enough to fill their place along the stairs.

Monitor

There are several hardscape features of the site that will need to be monitored in the future for repairs. A system for monitoring can be casual, as none of these features are in any current danger of creating problems. There are two walls, which are in good condition as of 2004, but they are old and should be watched for cracking or bowing. In particular, the wall along the edge of the road should be monitored. This wall has been in place since the Morrises' time, so it is a robust wall. However, there are one or two locations along this wall that are beginning to bulge from tree roots. If this wall breaks there will be erosion onto the road.

In the future, there may need to be more removals in the bed than are currently planned for. Since many dwarf plants are simply "slow growing," in another ten to twenty years we may be faced with a similar situation to the one we are faced with now. Plants may grow into one another and shade each other out. The bed is not static, and removals and replacements should be expected throughout the life of the bed. Drastic changes can be avoided with annual maintenance and assessment of the bed.

CONCLUSION

After 40 years of growth, the dwarf conifer bed needs updating. This paper has demonstrated how and why these repairs are to be done. During this year (2004) most of the planting will be completed, and future expansions are to be completed by 2006. Our hope is that the renovation of this bed will increase interest in the site. Visitors will be encouraged to walk through the bed and see up-close how different and unusual conifers can be. With adequate monitoring and care, the bed should remain a relevant and valuable display for the Arboretum for many years to come.

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APPENDIX A: PLANT LIST

Conifers:
Cedrus atlantica glauca witch's broom
Chamaecyparis obtusa 'Little Ann'
Chamaecyparis pisifera 'Squarrosa Intermedia'
Chamaecyparis pisifera 'White Pygmy'
Chamaecyparis thyoides 'Red Star'
Cryptomeria japonica 'Compressa'
Cryptomeria japonica 'Elegans Nana'
Juniperus communis 'Gold Cone'
Juniperus communis 'Compressa'
Microbiota decussata
Picea orientalis 'Bergman's Gem'
Picea pungens 'Glauca Prostrata'
Pinus parviflora 'Adcock's Dwarf'
Pinus pumila 'Yes-Alpina'
Pinus strobus 'Horstford's Dwarf' ('Horsford'?)
Taxus baccata 'Amersfoort'
Thuja korianensis
Thujopsis dolobrata 'Nana'
Tsuga canadensis 'Hussii'
Tsuga caroliniana 'Labar's Weeping'

Non-coniferous shrubs:
Acer palmatum 'cultivar'
Fothergilla gardenii 'cultivar'
Hamamelis sp.
Ilex sp.
Rhododendron sp.

Bulbs:
The bulbs should have a low growth habit (<15") and provide small bursts of color in several seasons. Colors should be understated, such as blues, whites, and purples. Some possibilities are:

Frittilaria montana (or other species that grows low)
Anemone blanda
Eranthus sp.
Galanthus sp.
Muscari sp.

Groundcovers:
Epimedium rubrum
Cyclamen hederifolium
Helleborus sp.

APPENDIX B: INTERPRETATION

Two signs will be placed at opposite ends of the bed discussing what dwarf conifers are and how they can be useful in a landscape. These signs will be 9" x 12" and contain line drawings and text. The following is a rough draft of the sign text.

Sign A: "What are Dwarf Conifers?

Dwarf conifers, which are compact versions of larger plants, are displayed in this bed. Conifers bear their seeds in cones that can be woody (as in pines, hemlocks, firs, etc.) or fleshy (as in yews and junipers). Dwarf is a relative term, and some dwarf plants can become quite large over time.

While many conifers are evergreen, this is not a defining characteristic. There are deciduous conifers, such as the dawn redwood (*Metasequoia glyptostroboides*), and there are evergreen plants that are not conifers, such as rhododendrons.

Conifers with unusual color, size, shape, branching habit, and many other characteristics are selected from seedlings or mutations on normal plants (i.e., witches' brooms). The selected individuals are reproduced vegetatively to maintain the desirable trait. The production of dwarf plants has grown exponentially in the last century, due to the increased need for plants that stay relatively small."

Sign B: "Dwarf Conifers in the Landscape

Most of the plants in this bed are dwarf conifers, a diverse group of plants with a range of colors, sizes, shapes and textures.

Aside from being lovely plants on their own, dwarf conifers fill essential roles in the garden. Evergreen conifers make ideal privacy screens to block views. Conifers provide structure, becoming the "backbone" of a well-designed landscape. They nicely accentuate the unique branching, early flowers, or striking bark of nearby shrubs, perennials, and bulbs. Most importantly, evergreen plants, like conifers, create beauty and interest in the garden all year.

Conifers are remarkably low-maintenance. They require some supplemental water and fertilizer while establishing, and selective pruning once a year. Beyond that, conifers are quite adaptable to a variety of soil and sun conditions. Using dwarf conifers in the landscape creates a low maintenance and attractive planting."

APPENDIX C: FUTURE PLANTINGS

Over the next two years the conifer bed will be expanded along the slope to the southeast, to the yuccas. Some recommended plantings and reasons for their selection are:

Conifers:
Abies balsamea 'Nana'
Cedrus deodara 'Blue Ball' – low mounded habit, blue leaves. Full sun.
Cephalotaxus harringtonia 'Duke Gardens' – medium spreading shrub. Full to part sun.
Chamaecyparis obtusa 'Golden Sprite' – miniature yellow bun. Full sun.
Chamaecyparis obtusa 'Hage' – miniature green mound. Full to part sun.
Juniperus communis 'Compressa' – upright column, green. Full sun.
Juniperus horizontalis 'Wiltonii – blue color, mat-forming habit. Full sun.
Picea omorika 'Pimoko' – low green and blue mound. Full sun.
Taxus baccata 'Semperaurea' – bright yellow foliage, low spreading habit. Full sun.

Non-coniferous species:
Similar to above: Rhododendrons, Ilex, Pieris, etc.
Also fill with groundcovers and bulbs.